PU020259 (JP11187367) ON 8468

(19) Patent Agency of Japan (JP)
(12) Official report on patent publication (A)
(11) Publication number: 11-187367
(43) Date of publication of application: 09.07.1999
(51) Int.Cl. H04N 7/10 H04N 7/24
(21) Application number: 9-350752
(22) Date of filing: 19.12.1997
(71) Applicant: NEC Corp
(72) Inventor: Muroi Yasuyuki
(54) Title of the invention: Video transmitter, video receiver and video transmitting system using these
(57) Abstract:
Problem to be solved: To prevent the stop of video due to the change of a transmitting band on a transmitting line at the time of transmitting digital moving video and to reproduce video by a reproducing rate in a band as high as possible.
Solution: At a video transmitter, video data (1) to (3) with plural video rates are prepared and a video receiver 2 detects the change of the transmitting band on the transmitting line 3 by the data quantity of a buffer memory 22 and sends a rate switch request signal to the device 1 to switch video data (1) to (3). Thus, the stop of video is prevented and video data of a higher quality is transmitted.

[Claims]

[Claim 1] A video transmitter is equipped with several video data in which image rates differ with the same image, data volume of a buffer memory of a video receiver which accumulates temporarily video data transmitted from the mentioned above video transmitter is detected during image reproduction, it changes and transmits to video data of an image rate lower than an image rate of video data transmitted now when the mentioned above data volume is smaller than the 1st reference value, a video transmitting system changing and transmitting to video data of an image rate higher than an image rate of video data transmitted now when the mentioned above data volume is larger than the 2nd reference value of a larger value than the 1st reference value.

[Claim 2] A video transmitting system including a video transmitter that is provided with several video data, a video receiver linked to the mentioned above video transmitter and in which the mentioned above video transmitter same image differs in an image rate, a rate change receiving part that receives an image rate switching request signal of video data transmitted from the mentioned above video receiver, while choosing either of the mentioned above a plurality of video data and transmitting to the mentioned above video receiver, according to the mentioned above image rate switching request signal,

it has an image data rate switching part that changes and transmits to video data of an image rate lower than video data transmitted now or a high image rate, a buffer memory in which the mentioned above video receiver accumulates temporarily video data received from the mentioned above video transmitter, a data volume primary detecting element that detects the amount of video data accumulated in the mentioned above buffer memory, and compares the 2nd larger reference value than the mentioned above amount of video data, the 1st reference value, and the mentioned above 1st reference value during reproduction of the mentioned above video data, when the mentioned above amount of video data is less than the mentioned above 1st reference value, when it exceeds the 2nd reference value with the mentioned above larger amount of video data than the mentioned above 1st reference value so that it may change to video data of an image rate lower than video data transmitted now and, a rate switching request part that transmits an image rate switching request signal to the mentioned above video transmitter so that it may change to video data of an image rate higher than video data transmitted now.

[Claim 3] The video transmitting system according to claim 2 characterized by that the mentioned above data volume primary detecting element detects data volume accumulated in the mentioned above buffer

memory with a certain time interval during reproduction of the mentioned above video data.
[Claim 4] The video transmitting system according to claim 1 or 2 characterized by that the mentioned above 1st reference value and the 2nd reference value are established for every aggregate of an image included in an identical program.
[Claim 5] A video transmitter including several video data in which image rates differ with the same image, a rate change receiving part that receives an image rate switching request signal of video data transmitted from a video receiver, an image data rate switching part that changes and transmits to video data of an image rate lower than video data transmitted now according to the mentioned above image rate switching request signal while choosing either of the mentioned above a plurality of video data and transmitting to the mentioned above video receiver or a high image rate.
[Claim 6] A video receiver including a buffer memory that accumulates temporarily video data received from a video transmitter, a data volume primary detecting element that detects the amount of video data accumulated in the mentioned above buffer memory, and compares the 2nd larger reference value than the mentioned above amount of video data, the 1st reference value, and the mentioned above 1st reference value during reproduction of the

mentioned above video data, when the mentioned above amount of video data is less than the mentioned above 1st reference value, when it exceeds the 2nd reference value with the mentioned above larger amount of video data than the mentioned above 1st reference value so that it may change to video data of an image rate lower than video data transmitted now, a rate switching request part that transmits an image rate switching request signal to the mentioned above video transmitter so that it may change to video data of an image rate higher than video data transmitted now.

[Claim 7] The video receiver according to claim 6 characterized by that the mentioned above data volume primary detecting element detects data volume accumulated in the mentioned above buffer memory with a certain time interval during reproduction of the mentioned above video data.

[Claim 8] The video receiver according to claim 6 characterized by that the mentioned above 1st reference value and the 2nd reference value are established for every aggregate of an image included in an identical program.

[Detailed description of the invention]

[0001]

[Field of the invention] This invention relates to the video transmitter, a video receiver, and the video transmitting system using these corresponding to the fall of the access speed of the video data especially based on change of the traffic of a transmitting line, about the video transmitting system that used a video transmitter and a video receiver.

[0002]

[Description of the prior art] When an animation is conventionally transmitted by circuits, such as the Internet to which the access speed of data is not guaranteed, by an usable transmission band changing with change of the traffic on a transmitting line, and being less from the transfer rate which the transmission rate of the video data to the client that receives an image and is displayed from the server that distributes an image needs, sufficient data volume for a client might not arrive from a server, but, as a result, the image might break off.

[0003] And the example kept from breaking off an image even when sufficient data volume did not arrive is indicated by the picture reproducer of JP 7-222113 A to such a problem. When the amount of accumulation received data of the video information temporary storage means with which the picture reproducer was equipped decreases, the image is kept

from breaking off in this patent by controlling video information reproduction speed and making it slow reproduction or a still picture.
[0004]
[Problems to be solved by the invention] In the prior art mentioned above, since video information reproduction speed is controlled and it is made slow reproduction or a still picture, when the amount of accumulation received data decreases, although an image does not break off, when slow reproduction and a still picture continue, there is a problem that a natural image is not acquired.
[0005] An object of this invention is to keep an image from breaking off, when the amount of accumulation received data decreases, without controlling video information reproduction speed.
[0006]
[Means for solving the problem] The 1st video transmitting system of this invention equips a video transmitter with several video data in which image rates differ with the same image, data volume of a buffer memory of a video receiver that accumulates temporarily video data transmitted from the mentioned above video transmitter is detected during image reproduction, it changes and transmits to video data of an image rate lower than an image rate of video data transmitted now when the mentioned above data volume is smaller than the 1st reference

value, when the mentioned above data volume is larger than the 2nd reference value of a larger value than the 1st reference value, it changes and transmits to video data of an image rate higher than an image rate of video data transmitted now.

[0007] Several video data in which the 2nd video transmitting system of this invention is provided with a video transmitter and a video receiver linked to the mentioned above video transmitter, and an image rate differs in the same image, while choosing a rate change receiving part that receives an image rate switching request signal of video data transmitted from the mentioned above video receiver, and either of the mentioned above a plurality of video data and transmitting to the mentioned above video receiver, according to the mentioned above image rate switching request signal, it has an image data rate switching part that changes and transmits to video data of an image rate lower than video data transmitted now or a high image rate, a buffer memory in which the mentioned above video receiver accumulates temporarily video data received from the mentioned above video transmitter, a data volume primary detecting element that detects the amount of video data accumulated in the mentioned above buffer memory, and compares the 2nd larger reference value than the mentioned above amount of video data, the 1st reference value, and the mentioned

above 1st reference value during reproduction of the mentioned above video data, when it exceeds the 2nd reference value with the mentioned above larger amount of video data than the mentioned above 1st reference value so that it may change to video data of an image rate lower than video data transmitted now when the mentioned above amount of video data is less than the mentioned above 1st reference value and. It includes a rate switching request part that transmits an image rate switching request signal to the mentioned above video transmitter so that it may change to video data of an image rate higher than video data transmitted now.

[0008] In the mentioned above data volume primary detecting element, the 3rd video transmitting system of this invention detects data volume accumulated in the mentioned above buffer memory with a certain time interval during reproduction of the mentioned above video data in the 2nd video transmitting system of this invention.

[0009] As for the 4th video transmitting system of this invention, in the 1st or 2nd video transmitting system of this invention, the 1st the mentioned above reference value and 2nd reference value are established for every aggregate of an image included in an identical program.

[0010] This invention is characterized by a video transmitter including several video data in which image rates differ with the same image, a rate change receiving part that receives an image rate switching request signal of video data transmitted from a video receiver, an image data rate switching part that changes and transmits to video data of an image rate lower than video data transmitted now according to the mentioned above image rate switching request signal while choosing either of the mentioned above a plurality of video data and transmitting to the mentioned above video receiver or a high image rate.
[0011] This invention is characterized by the 1st video receiver including a buffer memory that accumulates temporarily video data received from a video transmitter, a data volume primary detecting element that detects the amount of video data accumulated in the mentioned above buffer memory, and compares the 2nd larger reference value than the mentioned above amount of video data, the 1st reference value, and the mentioned above 1st reference value during reproduction of the mentioned above video data, when the mentioned above amount of video data is less than the mentioned above 1st reference value, when it exceeds the 2nd reference value with the mentioned above larger amount of video data than the mentioned above 1st reference value, so that it may change to video data of an image

rate lower than video data transmitted now and, a rate switching request part that transmits an image rate switching request signal to the mentioned above video transmitter so that it may change to video data of an image rate higher than video data transmitted now.

[0012] In the 1st video receiver of this invention, as for the 2nd video receiver of this invention, the mentioned above data volume primary detecting element detects data volume accumulated in the mentioned above buffer memory with a certain time interval during reproduction of the mentioned above video data.

[0013] As for the 3rd video receiver of this invention, in the 1st video receiver of this invention, the 1st the mentioned above reference value and 2nd reference value are established for every aggregate of an image included in an identical program.

[0014]

[Embodiment of the invention] An embodiment of the invention is described in details with reference to drawings.

[0015] Drawing 1 is a block diagram showing the composition of the 1 embodiment of this invention, and includes the transmitting line 3 that connects the video transmitter 1 that transmits video data, the video receiver 2 that performs reception of video

data, and the video transmitter 1 and the video receiver 2 and transmits video data.
[0016] And the video transmitter 1 is provided with video data (1) - video data (3) with a different reproduction rate for every same image, the image data rate switching part 11 changed to either video data (1) - video data (3), the video data transmission part 12 that transmits the video data outputted from the image data rate switching part 11 to the video receiver 2 by the transmitting line 3, the rate change receiving part 13 that receives the rate switching request from the video receiver 2.
[0017] The video receiver 2 is provided with the video data receiving part 21 that receives video data, the buffer memory 22 that accumulates the video data received in the video data receiving part 21, the image display 23 that acquires the video data accumulated in the buffer memory 22 one by one and reproduces an image, the data volume primary detecting element 24 that detects the data volume of the buffer memory 22 and the rate switching request part 25 required as changing the rate of video data to the video transmitter 1.
[0018] Drawing 2 is a drawing showing the data volume and the reference value in a buffer memory.
[0019] Next, operation of the 1 embodiment of this invention is explained in details using drawing 1 and 2.

[0020] The video data transmitted from the video data transmission part 12 of the video transmitter 1 chooses arbitrary one out of a plurality of video data (1) - (3) by the image data rate switching part 11, and is transmitted to the video data receiving part 21 of the video receiver 2 by the transmitting line 3. The video data receiving part 21 stores the received video data in the buffer memory 22 temporarily.
[0021] The image display 23 takes out video data from the buffer memory 22, and reproduces an image. The data volume stored in this buffer memory 22 is fluctuated by change of the access speed of the video data accompanying change of the traffic on the transmitting line 3. That is, if less from the transfer rate which the transmission rate of video data needs, the data volume stored in the buffer memory 22 will fall too.
[0022] As shown on drawing 2, the 1st reference value (a) and 2nd reference value (b) are set to the data volume of the buffer memory 22, and it has a relation of the 1st reference-value (a) < the 2nd reference value (b). This 1st reference value and the 2nd reference value are established for every aggregate of the image included in an identical program.
[0023] The data volume primary detecting element 24 directs to advance a rate switching request to the rate switching request part 25, when the data volume

stored in the buffer memory 22 during reproduction of video data is less than the 1st reference value or when it exceeds the 2nd reference value.

[0024] When the data volume stored in the buffer memory 22 is less than the 1st reference value, the rate switching request part 25 is required of the rate change receiving part 13 of the video transmitter 1, so that it may change to the video data of an image rate lower than the video data transmitted now. When the data volume stored in the buffer memory 22 exceeds the 2nd reference value, it requires of the rate change receiving part 13 of the video transmitter 1 so that it may change to the video data of an image rate higher than the video data transmitted now.

[0025] The rate change receiving part 13 of the video transmitter 1 receives the rate switching request from the rate switching request part 25, and notifies to the image data rate switching part 11.

[0026] Here, the video transmitter 1 is equipped with the video data that has three kinds of image rates to which the bit rate becomes high in the order of video data (1) -> video data (2) -> video data (3), and video data transmitted now is video data (2). In this case, since the bit rate becomes high at the order of video data (1) -> video data (2) -> video data (3), transmission speed becomes slow with a high bit rate so that, as for image quality, the part worsens and the video data (2) and (3) is turned into, although video

data (1) transmission speed becomes quick with a low bit rate, but as for image quality, the part becomes good.

[0027] When to change to the video data of an image rate lower than the video data transmitted now is demanded, the image data rate switching part 11, when to change from video data (2) to video data (1), and to change to the video data of an image rate higher than the video data transmitted now is demanded, it changes from video data (2) to video data (3).

[0028] Next, the data volume primary detecting element 24 of the video receiver 2 detects the data volume stored in the buffer memory 22 for every fixed time, repeats the operation explained above and performs it.

[0029]

[Effect of the invention] The 1st effect by this invention is being able to prevent the stop of graphic display, without controlling the video data reproduction speed by the side of a video receiver by changing the video data transmitted from a video transmitter to a low image rate, when the amount of accumulation received data of a buffer memory decreases.

[0030] In the network that change generates in access speed by the traffic of a transmitting line, the 2nd effect changes an image rate dynamically in the state

of the occasional network, and is a refreshable point about a high-definition image as much as possible.

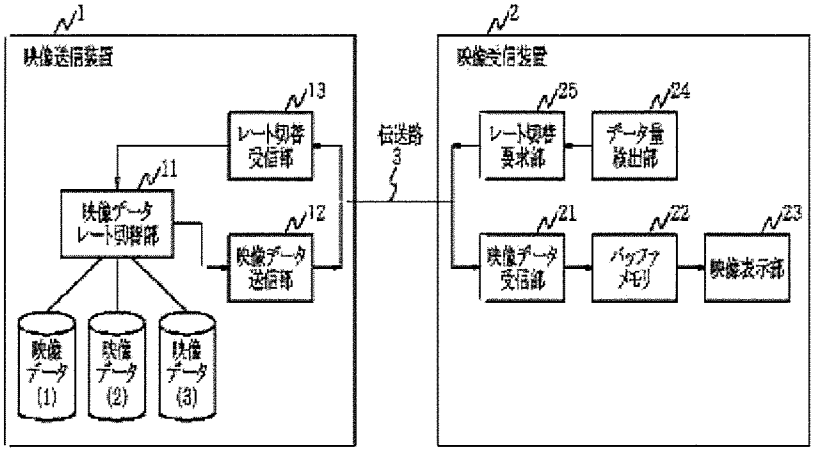
[Brief description of the drawings]

[Drawing 1] is a block diagram showing the composition of the 1 embodiment of this invention.
[Drawing 2] is a drawing showing the data volume and the reference value in a buffer memory.

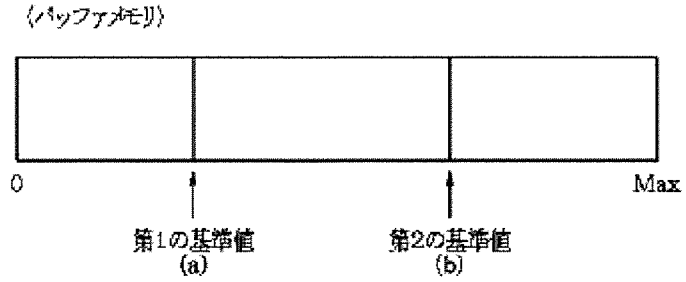
[Description of numerals]

1 Video transmitter
11 Image data rate switching part
12 Video data transmission part
13 Rate change receiving part
2 Video receiver
21 Video data receiving part
22 Buffer memory
23 Image display
24 Data volume primary detecting element
25 Rate switching request part
3 Transmitting line

Drawing 1



Drawing 2



[0<(a)<(b)<Max]